United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

Argued April 24, 2001 Decided July 24, 2001

No. 99-1457

Cement Kiln Recycling Coalition, et al.,
Petitioners

v.

Environmental Protection Agency and
Christine Todd Whitman, Administrator,
Respondents

Dow Chemical Company, et al.,
Intervenors

Consolidated with
99-1477, 99-1480, 99-1483, 99-1485, 99-1486,
99-1490, 99-1491, 99-1492, 99-1493, 99-1494,
99-1495, 99-1496, 99-1497, 99-1498

On Petitions for Review of an Order of the
Environmental Protection Agency

James S. Pew argued the cause for petitioner Sierra Club. With him on the briefs was Howard I. Fox.

Jeremiah J. Jewett, III, David P. Novello, Ronald A. Shipley, and Scott H. Segal argued the cause for Industry Petitioners. With them on the briefs were Richard G. Stoll, Michael W. Steinberg, Terry J. Satterlee, Alok Ahuja, Karl S. Bourdeau, David M. Friedland, Aaron H. Goldberg, Lisa M. Jaeger, David R. Case, Thomas G. Echikson, James N. Cahan, William M. Bumpers, David A. Smart, and Douglas H. Green.

David R. Case argued the cause and filed the briefs for petitioner Environmental Technology Council.

Richard G. Stoll, David P. Novello, Michael W. Steinberg, Ronald A. Shipley, Karl S. Bourdeau, David M. Friedland, Aaron H. Goldberg, Scott H. Segal, Lisa M. Jaeger, David R. Case, William M. Bumpers, and Jeremiah J. Jewett, III were on the brief for industry intervenors. Joshua D. Sarnoff entered an appearance.

Lois Godfrey Wye and Norman L. Rave, Jr., Attorneys, U.S. Department of Justice, and Steven E. Silverman, Attorney, Environmental Protection Agency, argued the cause for respondents. With them on the brief was Lois J. Schiffer, Assistant Attorney General at the time the brief was filed, U.S. Department of Justice. Christopher S. Vaden, Attorney, U.S. Department of Justice, entered an appearance.

James S. Pew and Howard I. Fox were on the brief for intervenor Sierra Club.

David R. Case was on the brief for intervenor Environmental Technology Council.

Before: Randolph, Rogers and Tatel, Circuit Judges.

Opinion for the Court filed Per Curiam.*

Per Curiam: In this case, industry and environmental petitioners challenge EPA air pollution standards for hazard-

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* Judge Tatel wrote Parts I, II, III, IV, and VII; Judge Randolph wrote Parts V and VI.

ous waste combustors. Because the standards fail to reflect the emissions achieved in practice by the best-performing sources as required by the Clean Air Act, we remand to the Agency for further proceedings. In all other respects, we deny the petitions for review.

I

Until 1990, the Clean Air Act ("CAA"), 42 U.S.C. ss 7401-7671q, required the Environmental Protection Agency to set risk-based air pollution standards that would provide an "ample margin of safety to protect the public health." Id. s 7412(b)(1)(B) (1990); see also H.R. Rep. No. 101-490, at 151, 322 (1990). To address problems with the implementation of risk-based regulation, Congress amended the Act in 1990 to require EPA to set the most stringent standards achievable, 42 U.S.C. s 7412(d)(2), that is, standards "based on the maximum reduction in emissions which can be achieved by application of [the] best available control technology." S. Rep. No. 101-228, at 133 (1989).

The 1990 amendments included the provision at issue in this case--42 U.S.C. s 7412(d)--which directs EPA to set standards limiting emissions of listed hazardous air pollutants ("HAPs"), id. ss 7412(b), (c)(1)-(2), from major stationary sources. Section 7412(d)(2) provides that:

> Emission standards ... shall require the maximum degree of reduction in emissions of the hazardous air pollutants subject to this section ... that the Administrator, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable for new or existing sources....

Supplementing this general guidance, Congress imposed minimum stringency requirements--EPA calls them "emission floors"--which "apply without regard to either costs or the other factors and methods listed in section 7412(d)(2)." Nat'l Lime Ass'n v. EPA, 233 F.3d 625, 629 (D.C. Cir. 2000) ("National Lime II"). For "new sources"--factories or other

sources on which construction begins after EPA publishes emission standards, 42 U.S.C. s 7411(a)(2)--"[t]he maximum degree of reduction in emissions that is deemed achievable ... shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source...." Id. s 7412(d)(3). For existing sources, what EPA deems achievable "shall not be less stringent than[ ] the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information)...." Id. As we explained in National Lime II, EPA implements these requirements through a two-step process: the Agency first sets emission floors for each pollutant and source category and then determines whether stricter standards, known as "beyond-the-floor" limits, are achievable in light of the factors listed in section 7412(d)(2). 233 F.3d at 629.

Hazardous waste combustors ("HWCs"), the focus of this case, are also subject to regulation under the Resource Conservation and Recovery Act ("RCRA"), 42 U.S.C. ss 6901-6992k, which "establishes a comprehensive 'cradle to grave' regulatory program for the treatment, storage, and disposal of hazardous waste." Horsehead Res. Dev. Co. v. Browner, 16 F.3d 1246, 1252 (D.C. Cir. 1994). A pre-1990 risk-based statute, RCRA directs EPA to set standards for hazardous waste-burning facilities that "protect human health and the environment." 42 U.S.C. s 6924(q)(1). Both Congress and EPA have acknowledged the overlap between RCRA and the CAA. Indeed, the CAA itself directs the Administrator to "take into account any regulations of such emissions which are promulgated under [RCRA] and ... to the maximum extent practicable ... ensure that the requirements of [RCRA] and [section 7412] are consistent." Id. s 7412(n)(7). Hazardous waste combustors must have RCRA permits for stack air emissions until they can demonstrate compliance with CAA standards through required tests; once a source complies with the CAA, it no longer needs a separate RCRA permit. Final Standards for Hazardous Air Pollutants for Hazardous Waste Combustors, 64 Fed. Reg. 52,828, 52,833 (Sept. 30, 1999).

In 1999, acting pursuant to CAA section 7412(d) and following notice and comment, EPA issued standards limiting emissions from three types of HWCs: incinerators that destroy hazardous waste; cement kilns that use hazardous waste as fuel in the cement-manufacturing process; and lightweight aggregate kilns that use hazardous waste as fuel to produce lightweight aggregate concrete, a building material used for structural purposes and thermal insulation. These HWCs burn approximately 80% of the hazardous waste combusted each year in the United States, id. at 52,832, emitting more than 11,000 metric tons of HAPs.

For each type of HWC, i.e., each "source category," EPA set standards for the following HAPs: dioxins; mercury; the semi-volatile metals lead and cadmium; the low-volatility metals chromium, arsenic, and beryllium; particulate matter; chlorine; carbon monoxide; and hydrocarbons. All of these HAPs can have serious health effects. Dioxin, mercury, and semi-volatile metal emissions are of particular concern; exposure can cause effects such as cancer, neurological and organ damage, and impaired child development. See id. at 53,002-03.

To set these standards, EPA, acting pursuant to section 7412(d)(3), began by setting emission floors for new and existing sources--EPA calls them "MACT (maximum achievable control technology) floors." After assembling a database of sources and their emission levels recorded primarily during RCRA compliance tests, the Agency went through the following steps for each HAP in each source category. For existing sources, EPA identified the best-performing 12 percent of sources, creating what it calls the "MACT pool." EPA then identified the primary emission control technology used by sources in the MACT pool with emission levels equivalent to or lower than the pool's median. It labeled that technology the "MACT control." For some HAPs, EPA chose end-of-stack pollution control technology as the MACT control; for other HAPs, the Agency chose the technique of "feedrate"--the rate at which source operators feed hazardous waste into combustors. EPA next expanded the MACT pool to include all sources using the MACT control (provided the control was

well-designed and properly operated) and set the MACT floor at the worst emission level achieved by any source in that expanded pool. For new sources, EPA used the same methodology but chose as the MACT control the technology used by the best-performing source for which it had information.

After setting forty-nine floors, EPA considered, as required by section 7412(d)(2), whether stricter limits--"beyond-the-floor" standards--would be achievable. Taking into account cost, energy requirements, and certain non-air quality health and environmental impacts, EPA ultimately set five beyond-the-floor standards.

Environmental and industry petitioners now challenge the HWC emission standards. The Sierra Club argues that: (1) the MACT approach results in emission standards that violate section 7412(d)(3) because they fail to reflect the emissions achieved in practice by the best-performing sources; (2) the Agency violated the Act by basing standards on RCRA test data, which are generated under worst-case conditions; and (3) in making beyond-the-floor determinations, the Agency failed to consider certain "non-air quality health and environmental impacts" as required by section 7412(d)(2) and arbitrarily and capriciously refused to consider tougher standards based on additional controls for some HAPs. Industry petitioners contend that EPA violated section 7412(d)(3)(A) by basing existing-source floors on actual emissions data rather than on existing regulatory requirements, such as RCRA permit limits. Industry petitioners also challenge as arbitrary and capricious many individual emission standards, as well as several monitoring and implementation regulations. One industry petitioner, Continental Cement, argues that EPA violated the Regulatory Flexibility Act, 5 U.S.C. ss 601-612. Another petitioner, the Environmental Technology Council, challenges EPA's adoption of procedures that permit sources to petition the Agency for alternative requirements if they cannot meet MACT standards due to raw material contributions to emissions. See 40 C.F.R. ss 63.1206(b)(9) & (10).

II

We begin with industry petitioners' argument that EPA violated CAA section 7412(d)(3)(A) by basing existing-source standards on emissions data rather than RCRA or other permit limits. Section 7412(d)(3)(A) provides that "[e]mission standards promulgated ... for existing sources ... shall not be less stringent ... than[ ] the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information)...." 42 U.S.C. s 7412(d)(3)(A). Focusing on the phrase "emission limitation," petitioners point out that CAA section 7602(k) defines that term as "a requirement established by the State or the Administrator which limits the quantity, rate, or concentration of emissions of air pollutants...." Id. s 7602(k). According to petitioners, section 7412(d)(3)(A) must therefore be read as follows: "[e]mission standards promulgated ... for existing sources ... shall not be less stringent ... than the average state or federal requirement limiting emissions of a pollutant achieved in practice by the best performing 12 percent of the existing sources." Indus. Petitioners' Opening Br. at 8.

Although EPA disputes this reading of the statute--it contends that CAA section 7412(d)(3)(A)'s use of the word "achieved" indicates that standards must be based on actual emissions data--the Agency argues that we may not even consider petitioners' argument because they failed to present it to the Agency during the rulemaking. See 42 U.S.C. s 7607(d)(7)(B) ("Only an objection to a rule or procedure which was raised with reasonable specificity during the period for public comment ... may be raised during judicial review."). Having reviewed each page of the record petitioners cite to demonstrate that they presented their interpretation of section 7412(d)(3)(A) during the rulemaking, we agree with EPA. The first cited comment argued only that the Agency should set the standard for particulate matter emissions from lightweight aggregate kilns at the same level as existing New Source Performance Standards ("NSPS"), to which EPA responded that "[w]e rejected the NSPS as the basis for the floor emission level because our MACT analysis of data from

existing sources indicates that a particulate matter floor level lower than the NSPS is currently being achieved in practice...." Final Response to Comments to the Proposed HWC MACT Standards, Vol. I: Standards ("1 Final Response to Comments"): LWAK Standards, at 13-14 (July 1999). The second cited comment stated only that "[t]he MACT floor should be set based on projections of Tier I allowable mercury feedrate limits," to which EPA responded, "[w]e agree that BIF Tier I feedrate limits could be considered as a floor control option. We conclude, however, that those allowable feedrate limits are much higher than actual feedrate levels ... and thus do not represent MACT." Id. Cement Kilns Mercury, at 7. As the Agency points out, these comments "merely argued that EPA could permissibly consider RCRA permit limitations in establishing floors," Respondent's Br. at 51, not (as petitioners now argue) that section 7412(d)(3)(A) requires existing-source floors to be based on permit limits. And the final page petitioners cite says nothing at all about existing regulatory limits. See Final Technical Support Document for HWC MACT Standards, Vol. III: Selection of MACT Standards and Technologies, at 2-2 (July 1999) ("3 Final TSD").

In considering the extent to which a statutory interpretation must have been presented to an agency before a petitioner can raise it here, we have said that:

> [w]hile there are surely limits on the level of congruity required between a party's arguments before an administrative agency and the court, respect for agencies' proper role in the Chevron framework requires that the court be particularly careful to ensure that challenges to an agency's interpretation of its governing statute are first raised in the administrative forum.

Natural Res. Def. Council, Inc. v. EPA, 25 F.3d 1063, 1074 (D.C. Cir. 1994). Though we have recognized that "precisely the same argument that was made before the agency [need not] be rehearsed again, word for word, on judicial review," Appalachian Power Co. v. EPA, 135 F.3d 791, 818 (D.C. Cir. 1998), petitioners point us to nothing in the record even

hinting that the phrase "emission limitation" must be defined by reference to section 7602(k). EPA (as opposed to its appellate counsel) has not had "the first opportunity to bring its expertise to bear on the resolution" of this question. Id.

III

The Sierra Club also challenges EPA's interpretation of CAA section 7412(d)(3), but on different grounds. The Sierra Club argues that section 7412(d)(3) requires floors to reflect emissions actually "achieved" by the best-performing sources, and that EPA violated the statute by setting floors the Agency considered achievable by all sources using MACT technology. See, e.g., 1 Final Response to Comments: MACT Floor Approaches, at 54-55 ("[W]e do not agree that the proper interpretation of the CAA would require that the MACT standards be based solely on an analysis of the emissions levels being achieved by the best performing 12% of sources.... MACT standard[s] must be achievable by all sources judged to be using MACT or MACT equivalent technology."). According to the Sierra Club, the contrast between the language of section 7412(d)(2), which requires the maximum degree of reduction "achievable," and section 7412(d)(3), which establishes that what EPA deems achievable "shall not be less stringent" than what certain sources actually "achieve[ ]," demonstrates that "Congress was well aware of the difference between what EPA believes to be 'achievable' through the use of a particular technology and what the relevant sources actually 'achieved.' " Sierra Club's Opening Br. at 20. "EPA's insistence that [section 7412] floors must reflect what the agency determines to be achievable through the use of a particular technology," the Sierra Club concludes, "boils down to an attempt to nullify the objective limits that Congress deliberately placed on EPA's standard setting discretion by enacting [section 7412]'s mandatory floor provisions in the 1990 Amendments." Id. at 21-22.

Defending its achievability rationale, EPA argues that section 7412(d)(3)'s floor provision "is a gloss" on section 7412(d)(2), which establishes the achievability requirement. Respondent's Br. at 23. According to the Agency, section

7412(d)(3) incorporates section 7412(d)(2)'s achievability standard. For this reason, EPA explains, it designed the MACT approach to produce achievable standards.

We agree with the Sierra Club. Though section 7412(d)(2) does direct EPA to require the "maximum emission reduction" that it determines to be achievable, section 7412(d)(3) provides that "the maximum degree of reduction in emissions that is deemed achievable ... shall not be less stringent than" what the best-performing sources "achieve[ ]." Section 7412(d)(3) therefore limits the scope of the word "achievable" in section 7412(d)(2). While standards achievable by all sources using the MACT control might also ultimately reflect what the statutorily relevant sources achieve in practice, EPA may not deviate from section 7412(d)(3)'s requirement that floors reflect what the best performers actually achieve by claiming that floors must be achievable by all sources using MACT technology. See Chevron U.S.A., Inc. v. Natural Res. Def. Council, Inc., 467 U.S. 837, 842-43 (1984) (holding that if Congress has spoken directly to the disputed issue of statutory construction, "that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress").

This interpretation is required by our decisions in Sierra Club v. EPA, 167 F.3d 658 (D.C. Cir. 1999), and National Lime II, 233 F.3d 625. In Sierra Club, we held that CAA section 7429(a)(2), which (in language virtually identical to the terms of section 7412(d)(3)) directs EPA to set emission floors for medical waste incinerators, requires EPA "to make a reasonable estimate of the performance of the top 12 percent of units." 167 F.3d at 662 (interpreting 42 U.S.C. s 7429(a)(2), which requires that "[t]he degree of reduction in emissions that is deemed achievable for new units in a category shall not be less stringent than the emissions control that is achieved in practice by the best controlled similar unit," and that "[e]missions standards for existing units in a category ... shall not be less stringent than the average emissions limitation achieved by the best performing 12 percent of units in the category"). While acknowledging that EPA has authority to devise the means of deriving this

estimate, we made clear that the method the Agency selects must "allow[ ] a reasonable inference as to the performance of the top 12 percent of units." Id. at 663. We emphasized that EPA must show not only that it believes its methodology provides an accurate picture of the relevant sources' actual performance, but also why its methodology yields the required estimate. Id. In evaluating EPA's new-source floors in particular, which the Agency based on emission levels achieved by the worst-performing sources using a given control technology, we concluded that EPA had not explained "why the phrase 'best controlled similar unit' encompasses all units using the same technology as the unit with the best observed performance, rather than just that unit itself, as the use of the singular in the statutory language suggests." Id. at 665. In National Lime II, we addressed a Sierra Club petition challenging emission standards set under section 7412(d) for non-hazardous waste-burning portland cement kilns. In evaluating EPA's standards, we reiterated Sierra Club's central holding that "to comply with the statute, EPA's method of setting emission floors must reasonably estimate the performance of the relevant best performing plants." 233 F.3d at 632 (citing Sierra Club, 167 F.3d at 665).

We thus turn to EPA's alternative argument: that the MACT approach does in fact measure what the best-performing sources actually achieve. According to EPA, Sierra Club requires standards to reflect "the worst reasonably foreseeable performance of the best unit[s]," 167 F.3d at 665. EPA argues that to meet this requirement, as well as to account for "inherent process variability in pollution control devices," the Agency set the floors at the worst emission level experienced by any source using the MACT control. Respondent's Br. at 28. Indeed, EPA claims, Sierra Club actually suggests that considering data from all sources using a common control approach is a reasonable means of estimating the performance of the best sources under the worst foreseeable circumstances.

The Sierra Club disagrees, arguing that EPA has failed to abide by Sierra Club because the Agency has not demonstrat-

ed that its floors based on the worst performers' emissions reflect a reasonable estimate of the emissions achieved in practice by the best-performing sources. As to new-source floors, the Sierra Club contends that Sierra Club, by questioning whether EPA can represent "the performance of the best performing source in the category with the performance of the worst performing source that uses the same technology[,].... casts serious doubt" on the legitimacy of the MACT approach as a means of implementing section 7412(d)(3). Sierra Club's Opening Br. at 27-28. Indeed, according to the Sierra Club, "common use of one control technology provides little or no reason to believe that the performance of the worst performing source that was using that technology is in any way representative of the best source's performance." Id. at 29-30. The Sierra Club points to other factors, such as the use of additional control techniques or of newer and better versions of MACT technology, better training of operators, and better design and operation of the source itself, that could all contribute to the best-performing source's level of emissions. By failing to consider these factors, the Sierra Club claims, EPA set floors that fail to reflect the estimates required by CAA section 7412 and Sierra Club.

Applying the principles set forth in Sierra Club and National Lime II, we again agree with the Sierra Club. To begin with, Sierra Club permits EPA to account for variability by setting floors at a level that reasonably estimates "the performance of the 'best controlled similar unit' under the worst reasonably foreseeable circumstances," 167 F.3d at 665, not the worst foreseeable circumstances faced by any unit in a given source category. Moreover, although Sierra Club also notes that "[p]erhaps considering all units with the same technology is justifiable because the best way to predict the worst reasonably foreseeable performance of the best unit with available data is to look at other units' performance," id., we explained in National Lime II that such an approach would satisfy the statute "if pollution control technology were the only factor determining emission levels of that HAP," 233 F.3d at 633 (emphasis added). Moreover, using language

especially relevant to this case, National Lime II observed that:

> it became clear [at oral argument] that the Sierra Club believes that EPA's MACT approach would not accurately estimate emission levels of the best performing twelve percent of plants if the best performing plants achieved their emission levels not just by using technology, but also by selecting cleaner manufacturing inputs. For example, the best performing twelve percent of plants might perform well because, in comparison to other plants having the same technology, they use less-polluting fuels or purer raw materials. Such plants would have predictably lower emissions than plants using MACT floor technology alone.

Id. at 632-33. National Lime II goes on to note that although "this argument may well have merit," id. at 633, the argument could not be considered because the Sierra Club failed to present it in its opening brief, thus failing to explain "why the emissions standards EPA set might not accurately estimate the performance of the best performing twelve percent of plants," id. at 632.

Here, unlike in National Lime II, the Sierra Club has argued that factors other than MACT technology influence emissions: "The best source may use other control techniques that the worst source does not, may use a newer and better version of the chosen technology, may train its operators more rigorously, or may simply be better designed and operated." Sierra Club's Opening Br. at 29. The statute itself, the Sierra Club points out, directs EPA to consider factors such as "process changes, substitution of materials or other modifications ... design, equipment, work practice, or operational standards ... [or] a combination of above," 42 U.S.C. ss 7412(d)(2)(A)-(E), suggesting that "Congress itself recognized that many factors ... affect sources' emissions," Sierra Club's Opening Br. at 29. In addition, the Sierra Club points to record evidence that other factors contribute to emissions. For example, although EPA's particulate matter floors for incinerators reflect what the Agency thought was

achievable with just one control technology--either a fabric filter, an electrostatic precipitator, or an ionizing wet scrubber, 64 Fed. Reg. at 52,864--record evidence suggests that some incinerators use these devices in combination with other control devices, see 3 Final TSD, at 4-2. As the Sierra Club also observes, EPA has acknowledged that different models of the same technology vary significantly in their performance. See id. at 4-3 ("Fabric filters with conventional woven fiberglass bags have demonstrated emissions control levels on [incinerators].... With improved fiberglass or Nomex felt and tri-loft fabrics, levels lower than 0.005 gr/dscf have been demonstrated. High performance membrane fabrics ... have demonstrated levels below 0.0010 gr/dscf over long term operation.").

The record contains still more indications that variables other than the MACT control affect HWC emissions. For example, in a 1996 technical support document, EPA observed that "[t]he MACT [expanded pool] contains conditions with a large range of [dioxin/furan] levels, from 0.005 to 38.5 TEQ ng/dscm. This indicates that the air pollution control device system type ... may not be the only important consideration[ ] affecting [dioxin/furan] control; other factors such as combustion quality and waste composition ... may also be of importance." Draft Technical Support Document for HWC MACT Standards, Vol. III: Selection of MACT Standards and Technologies, at 3-3 (Feb. 1996) ("3 Draft TSD"). In a 1999 technical support document detailing its strategy for estimating variability, EPA noted that "[t]he MACT [expanded pools] typically contain data from a wide variety of different sources within each HAP and source category combination, thus capturing the potential range in emissions due to differences in equipment operations, design, waste type, etc." 3 Final TSD, at 2-17 to 2-18; see also 64 Fed. Reg. at 52,857. Commenters also brought to the Agency's attention factors other than the MACT control. One commenter noted that:

> [t]he data in the expanded MACT pools ... do not provide meaningful information because many factors, other than the type of control device, significantly affect

> HWCs' emissions. Obvious examples of such factors include feedrates, various operating parameters, operator training and behavior, and variations between similar (but not identical) control devices.... Because many variables significantly influence emission rates, identifying the emissions rates associated with a particular type of control device indicates very little about the actual capability of that type of control device.

1 Final Response to Comments: MACT Floor Approaches, at 51. EPA responded to this comment not by explaining why these factors are insignificant to estimating emissions of the best-performers, but rather by claiming (as it does here) that floors must be achievable by all sources using MACT technology. See id. at 53-55.

We think this record evidence supports the Sierra Club's claim that because factors other than MACT technology affect emissions, emissions of the worst-performing MACT source may not reflect what the best-performers actually achieve. EPA's responses are unpersuasive.

The Agency argues that "there is no question as to the type of control device each source uses." Respondent's Br. at 38-39. But as the Sierra Club points out, this claim is non-responsive: just because EPA can identify which sources use the MACT control does not mean that factors other than the MACT control have no effect on emissions. The Agency also emphasizes that it "considered only the variability consistent with proper design and operation of MACT control." Id. at 39. Again, this claim misses the point: whether variability in the MACT control accurately estimates variability associated with the best-performing sources depends on whether factors other than the MACT control contribute to emissions. In other words, if factors other than MACT technology do indeed influence a source's performance, it is not sufficient that EPA considered sources using only well-designed and properly operated MACT controls.

EPA next claims that even though the performance of the MACT controls themselves vary, "effort[s] at further specification [of the MACT control] failed because the myriad factors that create operating variability proved impossible to

reliably quantify." Id. (citing 3 Draft TSD, at 2-6, which notes that instead of setting the MACT control as any fabric filter, the Agency could have differentiated among different fabric filter units according to parameters such as "cloth type, fabric age, cleaning practices, and pressure drop," but declined to do so "due to lack of information" on specific facilities' fabric filters). In a similar vein, the Agency claimed in a 1996 technical support document (though not in this court) that, at least in the case of the dioxin/furan standards, factors other than technology that affect emissions, "such as combustion quality and waste composition[,] ... are difficult to quantify for the definition of MACT." 3 Draft TSD, at 3-3. Even accepting the proposition that factors affecting source performance--either design features of the control itself (such as the type of fabric used) or non-MACT variables (such as waste composition or use of additional controls)--are difficult to quantify when defining the MACT control, nothing in the statute requires the Agency to use the MACT approach. Section 7412(d)(3) requires only that EPA set floors at the emission level achieved by the best-performing sources. If EPA cannot meet this requirement using the MACT methodology, it must devise a different approach capable of producing floors that satisfy the Clean Air Act. Indeed, the very fact that EPA recognizes both design differences in MACT technology and non-MACT factors as causes of wide-ranging variations in performance suggests that the emissions achieved by the worst-performing MACT source do not, as the CAA requires, represent a reasonable estimate of emissions achieved by the best-performing sources.

Finally, we are unpersuaded by EPA's claim that to account for the best-performing sources' operational variability, it had to base the floors on the worst performers' emissions. While we have recognized that a given control can experience operational variability, see Nat'l Lime Ass'n v. EPA, 627 F.2d 416, 424-25, 436, 439-41 (D.C. Cir. 1980) (recognizing variability in the performance of emission controls such as baghouses, ESPs, scrubbers, feed materials, and types of fuel), the relevant question here is not whether control technologies experience variability at all, but whether the variability expe-

rienced by the best-performing sources can be estimated by relying on emissions data from the worst-performing sources using the MACT control. In this case, the evidence EPA cites to support the MACT approach as a means of accounting for operational variability fails to demonstrate the relevant relationship. Some of the Agency's citations to the record merely contain assertions that "[the] approach ... fully accounts for normal process variability." 1 Final Response to Comments: MACT Floor Approaches, at 59; see also 64 Fed. Reg. at 52,923 (noting that HWCs are particularly susceptible to variability). The actual variability data EPA cites suggest only that emissions from sources using a given control vary over a wide range, not that the high emission levels achieved by sources at one end of that range reflect levels achieved by sources at the other end, nor that the best-performing sources ever experience a wide range of variability at all. See, e.g., 3 Draft TSD, at 3-3 to 3-12, 4-2 to 4-8; see also Final Technical Support Document for HWC MACT Standards, Vol. IV: Compliance with the HWC MACT Standards, at 4-7 (July 1999) (explaining the operating parameters of various control technologies). Indeed, throughout the rulemaking, EPA defended its reliance on the worst-performing MACT source as a means of setting achievable floors, not as a way of determining the operational variability experienced by the best-performing sources. See, e.g., 64 Fed. Reg. at 52,859 & n.77 (explaining that its decision to base the floors "on the highest test condition average for sources in the expanded MACT pool" was designed to ensure that all sources using the MACT control could achieve the standard).

What is more, statements in the record actually cast doubt on the possibility that the emissions of the worst-performing sources estimate the variability experienced by the best performers. For example, in the introduction to the proposed rule, EPA acknowledged that it considered a "12 percent approach," according to which it would have set the floors based on the statistical average of the 12 percent MACT pool and then added the "average within-test condition variability within the expanded MACT pool." Revised Standards for

Hazardous Waste Combustors, 61 Fed. Reg. 17,358, 17,367 (Apr. 19, 1996). EPA chose not even to propose this approach, however, concluding that "it could not be demonstrated that sources within the expanded MACT pool using MACT floor controls could achieve the floor levels" that resulted from the Agency's calculations. Id. The fact that EPA calculated the variability experienced by the top 12 percent of sources, but then declined to use those results to set the floors because they would not be achievable by all MACT sources, strongly suggests a real difference between emissions achieved by the worst-performing sources and the variability experienced by the best performers. Similarly, EPA's use of worst-case emissions data from RCRA compliance tests, during which sources routinely spike their feed--a practice we discuss in more detail in Part IV--further undermines the Agency's claim that to account for the variability experienced by the best-performing sources, it had to set floors based on the worst-performers' emissions: if, as the Agency claims, RCRA data reflect sources' performance under the worst foreseeable circumstances, why is the use of worst-case data, on its own, insufficient to account for the variability in emissions experienced by the best-performing sources?

To sum up, the possibility we acknowledged in National Lime II--that the "best performing plants achieve[ ] their emission levels not just by using technology," 233 F.3d at 633--appears to have been borne out in this case. Because record evidence suggests that factors other than the MACT control influence emissions, EPA has not demonstrated, in Sierra Club's words, that floors based on the worst-performing MACT sources' emissions represent "a reasonable estimate of the performance of the [best-performing] units." 167 F.3d at 662. To be sure, it is not our place to dictate to the Agency how to account for variables other than the MACT control. If in the case of a particular source category or HAP, the Agency can demonstrate with substantial evidence--not mere assertions--that MACT technology significantly controls emissions, or that factors other than the control have a negligible effect, the MACT approach could be a reasonable means of satisfying the statute's requirements.

See Nat'l Lime II, 233 F.3d at 633. But even if, as EPA claims, accounting for non-MACT factors is difficult, the Agency may not use a proxy for the best performers that it has considerable reason to believe falls short of section 7412(d)(3)'s requirements.

IV

As part of its challenge to the MACT approach, the Sierra Club contends that EPA violated the Clean Air Act by relying on "worst-case data" to derive the HWC standards. In setting the floors, EPA relied on emissions data generated during incinerator trial burn tests and RCRA compliance testing of cement and lightweight aggregate kilns. During such testing, sources often operate under worst-case conditions by

> spiking metals and chlorine in the waste feed [and] detuning the emissions control equipment.... [T]hese sources conduct tests in a manner that will establish a wide envelope for their operating parameter limits in order to accommodate the expected variability ... [in] types of wastes, combustion system parameters, and emission control parameters.

64 Fed. Reg. at 52,858. The Sierra Club argues that because compliance data reflect abnormally bad performance, they "do not represent any source's actual performance." Sierra Club's Opening Br. at 23. Indeed, "sources' emissions during normal operations tend to be less than one half of their 'worst-case' emissions." Id.

Defending its use of RCRA compliance data, EPA argues that such data are in fact actual test results and therefore reflect actual source performance. The fact that RCRA data measure worst-case conditions, the Agency explains,

> merely confirms that standards based on the data reflect the most adverse conditions that can reasonably be expected to recur.... Because these test conditions are specifically designed to help account for operating variability, they are more helpful than normal operating data

> would be in estimating performance under a variety of conditions and thus in helping to assure that properly designed and operated sources can achieve the standard.

Respondent's Br. at 33 (internal quotation omitted). According to EPA, because the statute permits it to use available information to identify the best-performing sources, and because RCRA data are available information, it reasonably relied on RCRA test results.

Section 7412(d)(3) requires EPA to set emission floors based on "the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information)." 42 U.S.C. s 7412(d)(3)(A) (emphasis added). We think it not at all unreasonable for the Agency to read this language as permitting it to rely on "information" in its database--i.e., the RCRA data. See Chevron, 467 U.S. at 843 ("[A] court may not substitute its own construction of a statutory provision for a reasonable interpretation made by the administrator of an agency."). And as we pointed out in Sierra Club, "EPA typically has wide latitude in determining the extent of data-gathering necessary to solve a problem. We generally defer to an agency's decision to proceed on the basis of imperfect scientific information, rather than to invest the resources to conduct the perfect study." 167 F.3d at 662 (internal quotation omitted). Although sources do spike their feed during RCRA compliance tests, the Sierra Club has offered us no basis for concluding that using RCRA data would prevent EPA from identifying the best-performers and predicting their emissions under the "worst reasonably foreseeable circumstances." Id. at 665. In other words, the Sierra Club has failed to demonstrate that EPA's model "bears no rational relationship to the reality it purports to represent," Columbia Falls Aluminum Co. v. EPA, 139 F.3d 914, 923 (D.C. Cir. 1998) (internal quotation omitted).

V

Industry petitioner Continental Cement claims that EPA failed to meet its obligations under the Regulatory Flexibility

Act ("RFA"), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 ("SBREFA"). Pub. L. No. 96-354, 94 Stat. 1165-70 (1980), codified at 5 U.S.C. ss 601-612, as amended by Pub. L. No. 104-121, 110 Stat. 864 (1996). Failure to comply with the RFA "may be, but does not have to be, grounds for overturning a rule." Small Refiner Lead Phase-Down Task Force v. EPA, 705 F.2d 506, 538 (D.C. Cir. 1983).

Under the RFA, agencies promulgating a rule that will have a "significant impact" on "small entities" are required to "prepare and make available for public comment an initial regulatory flexibility analysis ... [that] describe[s] the impact of the proposed rule" on those entities, and to publish a "final regulatory analysis" with the final rule. 5 U.S.C. ss 605, 603, 604. Small entities include small businesses, small organizations, and small governmental jurisdictions. Id. s 601(6). The regulatory analysis forces the agency to consider various factors set forth in the statute, including "a description of the steps the agency has taken to minimize the significant economic impact [of the rule] on small entities." Id. s 604(a) (final regulatory flexibility analysis); see also id. ss 603(b) & (c) (initial regulatory flexibility analysis).

This procedure is intended to evoke commentary from small businesses about the effect of the rule on their activities, and to require agencies to consider the effect of a regulation on those entities. An agency may dispense with the regulatory analysis if it certifies "that the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities." Id. s 605(b). EPA relied on the s 605(b) exception.

In seeking to determine whether its regulations would have "significant economic impact" on a "substantial number of small entities," 64 Fed. Reg. at 53,023-24, EPA examined the entities that would be "directly impacted"--hazardous waste combustion facilities. EPA concluded that only six of the HWC facilities met the definition of a "small business" and that only two of these would experience compliance costs in excess of one percent of annual sales. Id. at 53,024. EPA

therefore certified that there would be no significant impact on a substantial number of small business HWC facilities. Id. EPA then considered the economic effects of the new rule on small businesses that generate and blend the hazardous waste consumed in the HWCs. Id. EPA did not believe the statute required it to conduct this inquiry, but it decided to do so in the "spirit" of the RFA because some portion of the burden of compliance might pass through to the generators and blenders of hazardous waste. Id. at 53,023-24. As to these entities, EPA did not certify that there would be no "significant impact" on a "substantial number" of small businesses. Id.

Continental claims that EPA should have considered each category of HWCs separately in conducting its "direct impact" analysis. Continental also maintains that EPA had to certify that there would be no substantial effect on generators of hazardous waste in order to meet the requirements of the RFA. In response, EPA argues that it complied with the requirements of the RFA.

Continental is a "cement manufacturer" under the relevant Small Business Administration Regulations, and therefore qualifies as a small business because it has fewer than 750 employees. Small Business Size Regulations, 65 Fed. Reg. 30,836, 30,847 (May 15, 2000). While Continental's petition did not refer to its status as a hazardous waste generator, we accept counsel's representation at oral argument that the company also generates hazardous waste, and therefore is not bringing this claim solely in its capacity as a hazardous waste combustor. Accordingly, Continental has standing.

We decline to consider Continental's argument that EPA should have conducted independent RFA analyses for each class of HWCs. Continental's opening brief contains only a single conclusory sentence stating this point, and its reply brief does nothing to expand on the subject. A litigant does not properly raise an issue by addressing it in a "cursory fashion" with only "bare-bones arguments." Wash. Legal Clinic for the Homeless v. Barry, 197 F.3d 32, 39 (D.C. Cir. 1997); Terry v. Reno, 101 F.3d 1412, 1415 (D.C. Cir. 1996);

Carducci v. Regan, 714 F.2d 171, 177 (D.C. Cir. 1983). Even if the briefing were sufficient to raise this issue, it certainly is not persuasive enough to carry Continental's burden of showing that the agency's analysis was arbitrary and capricious.

As to Continental's second claim regarding generators of hazardous waste, this court has consistently rejected the contention that the RFA applies to small businesses indirectly affected by the regulation of other entities. Mich. v. EPA, 213 F.3d 663, 688-89 (D.C. Cir. 2000); Motor & Equip. Mfrs. Ass'n v. Nichols, 142 F.3d 449, 467 (D.C. Cir. 1998); Mid-Tex Elec. Coop. v. FERC, 773 F.2d 327, 342 (D.C. Cir. 1985). EPA's rule regulates hazardous waste combustors, not waste generators. We explained in Mid-Tex that the language of the statute limits its application to the "small entities which will be subject to the proposed regulation"--that is, those "small entities to which the proposed rule will apply." Mid-Tex Elec. Coop., 773 F.2d at 342 (quoting 5 U.S.C. s 603(b)). Congress "did not intend to require that every agency consider every indirect effect that any regulation might have on small businesses in any stratum of the national economy." Id. at 343.

Continental acknowledges these precedents, but seeks to distinguish this case on the basis that EPA actually intended to affect the conduct of hazardous waste generators by raising the cost of incineration. This increase in cost would create an economic incentive to minimize waste production. As evidence, Continental cites the portion of the preamble to the rule which states that the rule "fulfills our 1993 and 1994 public commitments to upgrade emissions standards for HWCs. These commitments are the centerpiece of our Hazardous Waste Minimization and Combustion Strategy." 64 Fed. Reg. at 52,832. Continental also refers us to EPA's statement that "[a]s today's rule is implemented, the costs of burning hazardous waste will increase, resulting in market incentives for greater waste minimization." 64 Fed. Reg. at 53,021.

Contrary to what Continental supposes, application of the RFA does turn on whether particular entities are the "tar-

gets" of a given rule. The statute requires that the agency conduct the relevant analysis or certify "no impact" for those small businesses that are "subject to" the regulation, that is, those to which the regulation "will apply." Mid-Tex Elec. Coop., 773 F.2d at 342; 5 U.S.C. s 605(b)(3). EPA's rule applies, by its terms, only to HWCs. The rule will doubtless have economic impacts in many sectors of the economy. But to require an agency to assess the impact on all of the nation's small businesses possibly affected by a rule would be to convert every rulemaking process into a massive exercise in economic modeling, an approach we have already rejected. See Mid-Tex Elec. Coop., 773 F.2d at 343.

VI

The Environmental Technology Council, a trade association representing firms involved in disposal of hazardous wastes, petitions for review of 40 C.F.R. ss 63.1206(b)(9) & (10). These provisions create alternative emission standards for cement kilns and lightweight aggregate kilns. EPA expressed concern that some sources might not be able to meet some of the MACT standards because of raw material contribution to emissions, and therefore enacted the alternative standards for SVMs, LVMs, chlorine and mercury. Id.; see also 64 Fed. Reg. at 52,962-67; Revised Standards for Hazardous Waste Combustors, 61 Fed. Reg. 17,358, 17,395 & 17,405 (Apr. 19, 1996); Final Response to Comments to the Proposed HWC MACT Standards, Volume II: Compliance: Equivalency Determination and Alternate Standards, at 7 (July 1999). The Council contends that these provisions violate the language of s 7412, and are arbitrary and capricious. We refuse to consider these contentions because the Council lacks prudential standing.

The Council rests its claims of constitutional and prudential standing on the ground that its members will suffer "economic and competitive injury, most significantly diminished value of capital investment, if competing facilities are excused from the MACT standards and thereby avoid the substantial compliance costs." Envtl. Tech. Council's Opening Br. at 7.

According to the Council, its members have already made substantial investments in various pollution control technologies and constitute the "best performing sources" to which the CAA refers in s 7412(d). It alleges that its interests in ensuring that other HWCs comply with the MACT standards (which they concede are purely economic), are congruent with the interests protected by the statute, and that it is therefore a "suitable challenger" within the zone of interests of the CAA.

The Council appears to have constitutional standing. It claims that there are numerous costs associated with meeting the MACT standards, and that EPA's creation of an alternative standard will save some competitors from those costs.1 Basic economics indicates that a competitor whose costs are lower will be able to provide services at lower cost--and one can reasonably expect this to result in lost business to the Council's members. Accordingly, we think the Council has met its constitutional obligation to show injury, causation, and redressability. Lujan v. Defenders of Wildlife, 504 U.S. 555, 560-62 (1992).

The problem for the Council is that we have previously rejected prudential standing in two nearly identical cases in which industry groups claimed to be suitable challengers to regulations directed at competitors. Hazardous Waste Treatment Council v. EPA, 885 F.2d 918 (D.C. Cir. 1989) (HWTC IV); Hazardous Waste Treatment Council v. EPA, 861 F.2d 277 (D.C. Cir. 1988) (HWTC II). To demonstrate prudential standing, ordinarily a party must show that the interest it seeks to protect "is arguably within the zone of

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1 At oral argument the court pointed out to counsel that the alternative standards require a facility seeking the exemption to demonstrate that "even though [it uses] MACT control" technology, it still cannot meet the standard. 64 Fed. Reg. at 52,965-66. In light of this, the court inquired what injury the exception might inflict on the Council's members. The attorney for the Council explained that the "best performing sources" rely on techniques other than just technological aids to reduce pollution, and that these techniques cost money to implement. EPA did not contest this representation.

interests to be protected or regulated by the statute ... in question." Ass'n of Data Processing Serv. Orgs. v. Camp, 397 U.S. 150, 153 (1970). Under this "zone of interests" test, the "essential inquiry is whether Congress 'intended for [a particular] class [of plaintiffs] to be relied upon to challenge agency disregard of the law.' " Clarke v. Securities Indus. Ass'n, 479 U.S. 388, 399 (1987) (quoting Block v. Cmty. Nutrition Inst., 467 U.S. 340, 347 (1984)). While the "zone of interests" test is not meant to be "especially demanding," it will deny standing to one claiming to be a "suitable challenger" when "plaintiff's interests are so marginally related to or inconsistent with the purposes implicit in the statute that it cannot reasonably be assumed that Congress intended to permit the suit." Id.

In HWTC II we considered the claim of an industry group similar to the Council that challenged EPA regulations under RCRA and sought tighter controls on competitors.2 861 F.2d at 282. Petitioner there claimed prudential standing because "tightening of environmental standards will generally foster not only a cleaner environment but also expand the member companies' profits, as it will expand the market for their services." Id. Petitioner argued that its interests were "in sync" with those served by RCRA. We rejected this argument. The "consumers of the environmental purity afforded by RCRA seem highly suitable champions of enforcement." Id. at 284. Petitioner's interest was not in environmental purity, but in increasing the regulatory burden on its competitors. To hold that this satisfied prudential standing would be to create "a considerable potential for judicial intervention that would distort the regulatory process." Id. at 285. We followed the same analysis in HWTC IV. 885 F.2d at 922-26.

The case before us is identical to HWTC II and IV, except that the relevant statute is the CAA, not RCRA. The

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2 EPA contends that the Council is actually the same organization as the HWTC, with a different name. The Council does not contest this representation. Whether the two organizations are the same does not matter here, however, as it is clear that their positions and arguments are identical.

Council thinks this makes all the difference--that by adopting a technology-based approach to emissions standards, Congress aligned the interests of competitors and environmentalists in such a way as to bring the former into the zone of interests. We disagree. The Council has identified nothing to indicate that Congress' shift to a technology-based approach was anything more than a determination that this would provide a more workable basis for promulgating standards. The statute's language indicates that, contrary to the Council's contention, Congress' "evident purpose" was not to "compel[ ] those sources with less-than-best pollution control to invest in upgraded equipment." Neither the statute nor the rules actually require HWCs to use the same methods of emission control used by the best performing sources; they must only meet the standards of those that do. See 42 U.S.C. s 7412(d)(2); 64 Fed. Reg. at 52,963 n.255. As in the HWTC cases, the Council's interest lies only in increasing the regulatory burden on others. See HWTC IV, 885 F.2d at 924-25; HWTC II, 861 F.2d at 285. The Council therefore lacks prudential standing.

VII

We remand the HWC floors to EPA for further proceedings consistent with this opinion. In so doing, we emphasize that we do not expect the impossible of the Agency. Floors need not be perfect mirrors of the best performers' emissions. But whether EPA chooses end-of-stack technology or feedrate as the MACT control, or abandons the MACT approach altogether, CAA section 7412(d)(3), as interpreted by this court in Sierra Club and National Lime II, requires that floors reflect a reasonable estimate of the emissions "achieved" in practice by the best-performing sources. See Nat'l Lime II, 233 F.3d at 632.

Because EPA will have to set new floors, we need not address the Sierra Club's additional arguments that in deciding whether to set beyond-the-floor standards pursuant to CAA section 7412(d)(2), EPA failed to consider several non-air quality health and environmental impacts that commen-

ters claimed result from HWC emissions, as well as whether stricter standards based on additional controls would be achievable. See id. at 634 (declining to address beyond-the-floor arguments regarding two HAPs because the floors for those HAPs were being remanded). Nor, for the same reason, need we consider industry petitioners' challenges to specific standards.

Finally, the Sierra Club requests that we leave the current regulations in place during remand in order to "avoid serious adverse implications for public health and the environment that would result from vacating the regulations (and thus allowing hazardous waste combustors to emit even more HAPs than allowed by the regulation[s] ...)." Sierra Club's Opening Br. at 36. Though we granted similar requests in Sierra Club, 167 F.3d at 664, and National Lime II, 233 F.3d at 635, we think this case is different: in Sierra Club, there were no industry petitioners, and in National Lime II, we considered and rejected industry claims. Here, in contrast, we have chosen not to reach the bulk of industry petitioners' claims, and leaving the regulations in place during remand would ignore petitioners' potentially meritorious challenges. For example, industry petitioners may be correct that EPA should have exempted HWCs from regulatory limits during periods of startup, shutdown, and malfunction, permitting sources to return to compliance by following the steps of a startup, shutdown, and malfunction plan filed with the Agency. We have similar doubts about EPA's decision to require sources to comply with standards even during openings of emergency safety valves caused by events beyond the sources' control. It is also possible that some of the emission standards themselves would not have withstood arbitrary and capricious analysis: when setting the beyond-the-floor standard for dioxin emissions from lightweight aggregate kilns, EPA may have relied inappropriately on data from cement kilns (a method it had previously rejected) to demonstrate that the standard was achievable; in setting the beyond-the-floor standard for semi-volatile metal emissions from cement kilns, EPA may have exceeded its statutory mandate by

relying on policy objectives other than those enumerated in section 7412(d).

In light of these circumstances, we think the better course of action is to vacate the challenged regulations. Because this decision leaves EPA without standards regulating HWC emissions, EPA (or any of the parties to this proceeding) may file a motion to delay issuance of the mandate to request either that the current standards remain in place or that EPA be allowed reasonable time to develop interim standards. See Columbia Falls, 139 F.3d at 924 ("If EPA wishes to promulgate an interim treatment standard, the Agency may file a motion in this court to delay issuance of this mandate in order to allow it a reasonable time to develop such a standard.").

So ordered.